

## Unmanned Aircraft Systems Ground Collision Severity Evaluation

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### Purpose

- The Unmanned Aircraft System (UAS) Ground Collision Severity Evaluation study will provide data to help inform:
  - What are the severity criteria for Unmanned Aircraft System (UAS) collisions, such as weight, kinetic energy, etc.?
  - What is the severity of a UAS collision with person or property on the ground?
  - How can the design of a UAS minimize potential damage during a ground collision?
  - Can we categorize the severity of a UAS collision with a person or property on the ground based on the UAS and what would those categories look like?

### Background

- UAS airworthiness considerations require an understanding of the hazard severity and likelihood of ground collision for UAS operations in the NAS
- Hazard severity threshold characteristics will be addressed for UAS to include:
  - Traditional aluminum and various composite construction aircraft
  - Fixed wing and rotary wing aircraft
  - Tractor and pusher propulsion systems
  - Flammable materials, such as fuel
  - Hazardous kinetic energies based on combinations of mass and speed

### Projected Benefit of Research

- Inform operational approval restrictions for small UAS based on collision risk to person and/or property
- Inform small UAS design requirements to reduce the severity of collision with persons and/or property
- Inform risk mitigation requirements for small UAS to reduce the risk during ground collisions
- Inform potential mitigation requirements to assure the safety of UAS operations beyond visual line of sight
- Inform a means of compliance for showing the injury potential during a ground collision

### Research Approach

- Utilize encounter scenarios with persons/property on the ground to test UAS hazard severity characteristics
- Determine thresholds for serious, but non-lethal injury
- Recommend a range of hazard severities for the different characteristics and group UAS together based on risk levels

### Research Partners

- The FAA's Center of Excellence for UAS Research, Alliance for System Safety of UAS through Research Excellence (ASSURE) University of Alabama-Huntsville, Embry-Riddle Aeronautical University, Mississippi State University, University of Kansas

### Status

- Research began September 2015
- Research findings underwent peer review process with NASA and DoD
- Results released April 2017
- Second phase of research set to begin June 2017

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